

presenting

TOUCHE®

*high-tech performance instrument
from Buchla and Associates*

HERE'S AN INSTRUMENT THAT PUTS THE POWER OF COMPUTER TECHNOLOGY AT YOUR FINGERTIPS

Touché combines both analog and digital circuitry in a unique hybrid architecture that develops the advantages of both approaches. User communications and data processing are handled by a self-contained 16 bit computer operating under the direction of FOIL, an advanced interactive music language especially designed for Touché. Easy to learn and use, FOIL applies techniques of man-machine communication that facilitate rapid access to Touché's vocabulary and enable real-time editing and performance.

Sound production in Touché is accomplished with a pipelined, multiplexed digital signal generator that assures absolute pitch accuracy (crystal derived) and provides timbral possibilities formerly available only to those with access to major computer installations. Touché's 24 digital oscillators are combined into eight voices that are playable in a variety of polyphonic, split keyboard, and multi-instrument modes.

Additionally, Touché contains a specialized hybrid processor that accepts multiple user inputs and simultaneously directs the progress of 64 acoustic parameters, each with a time resolution of 1/1000 of a second. This facility enables precise specification of complex sonic detail and offers expanded possibilities for expressive articulation.

Touché's programmability extends far beyond the storage of knob settings - instrument definitions include precise specification of multiple temporal variables as well as minute details of the timbral palette. Up to 32 labeled instrument definitions are instantly accessible; additional definitions may be stored on tape for subsequent retrieval.

Touché is flexible - with practically unlimited signal generation capabilities, Touché relies on software to realize its operational characteristics. And that makes updating easy and economical - new versions of FOIL will keep Touché a growing and vital instrument with ever-expanding resources.

SO GET YOUR DIGITS DANCING TO THE TUNE OF TOUCHÉ. YOU'LL NEVER BE KEYBORED AGAIN!

INSTRUMENT SELECTION

This facility provides immediate access to the 32 *instrument definitions* that reside in Touché's memory. Each of these *instruments* relates, in arbitrarily complex or subtle ways, performance gestures to the various acoustic responses that comprise Touché's vocabulary. Any two instruments may be played simultaneously; selection is accomplished by touching the *select* button followed by two digits from the *data entry* array.

OUTPUT AMPLITUDE

Touché is designed to drive four channels of power amplification, with speakers clustered, spread across the stage, or surrounding a room. Special phasing circuits provide unusual depth and imaging in the resultant acoustic field. This master volume controls the four channel output as well as stereo and monophonic submixes. A headset output, with separate balance and level controls, is on the rear panel.

MODE

In the *edit* mode, the 3 axis tablet becomes the means for efficient access to stored instrument definitions, which are displayed on a TV or video monitor. In the *play* mode, the tablet resumes its role as a performance input, and editing functions are inhibited. The *reset* button provides fast access to an initial state, with all modes and offsets normalized and instruments 1 and 2 selected for playing.

THREE-AXIS TABLET

Touch the tablet and Touché responds with note bending, vibrato, timbre shadings, in any combination and to any degree. With no moving parts and a variety of software controlled modes, this solid state joystick far exceeds the capabilities of wheels and ribbons.

CABINET

Hand crafted of select Koa, the beauty of Touché's housing is a pride and care that go into its construction. The hinged top is an invitation to peer inside - the components are built like Touché.

OCTAVE REGISTRATION

Transposition controls and octave indicators for each of two instruments extend Touché's range by eight octaves.



OUTPUT MIX AND

The relative loudness of instruments is determined by a manual panning enable. The transformation of one instrument into another.

wood, the
reflects the
to its con-
is your
new instru-

ON
d in-
instru-
ge to

DATA ENTRY

Touché is equipped with a sophisticated interactive music language (FOIL) that permits the user to readily create or alter instrument definitions. This *data entry* section is the primary input to FOIL; the output is via a standard video monitor. Note that information can be entered either digitally or via knob settings; and that the effect of changing data is immediately perceivable - this a real time, interactive editing facility.

FINE TUNING

Touché, with its crystal controlled digital oscillators, has perfect pitch. There's no drift, no adjustments, no autotune. This fine tuning knob is provided to facilitate playing in ensemble with other instruments.

PARAMETER ARTICULATION

Touché's unusual sonic range is realized with a specialized digital oscillator in which a number of parameters can be specified and stored as part of instrument definitions. Occasionally, in performance situations it is desirable to have immediate access to these variables - hence the inclusion of this section. Rear panel inputs allow external voltage control or foot pedal control of the oscillator parameters and front panel knobs allow static offsetting of these parameters. The net results are displayed by light emitting diodes, and can be applied to either or both of the two current instrument definitions.

PROGRAMMED STIMULI

The music language (FOIL) used to define Touché's instrumental repertoire includes provision for selectively activating or modifying certain processes. These touch switches, with self-contained status indicators, provide the musician with the requisite controls. Additional such programmed stimuli, originating from foot pedals or external voltages may be applied to back panel inputs.

TAPE CONTROL

With Touché's facility for tape storage and retrieval your library of instrumental resources knows no bounds. 32 instruments are just a touch away - hundreds more can be stored on a single cassette.

KEYBOARD

A specialized digital keyboard processor provides fast, accurate and musically logical polyphonic response; silver contacts and double buss switching assure long-term reliability. This keyboard features pressure sensitivity - any combination of Touché's variables can be programmed to respond to the dynamics of playing.

TIME SCALING

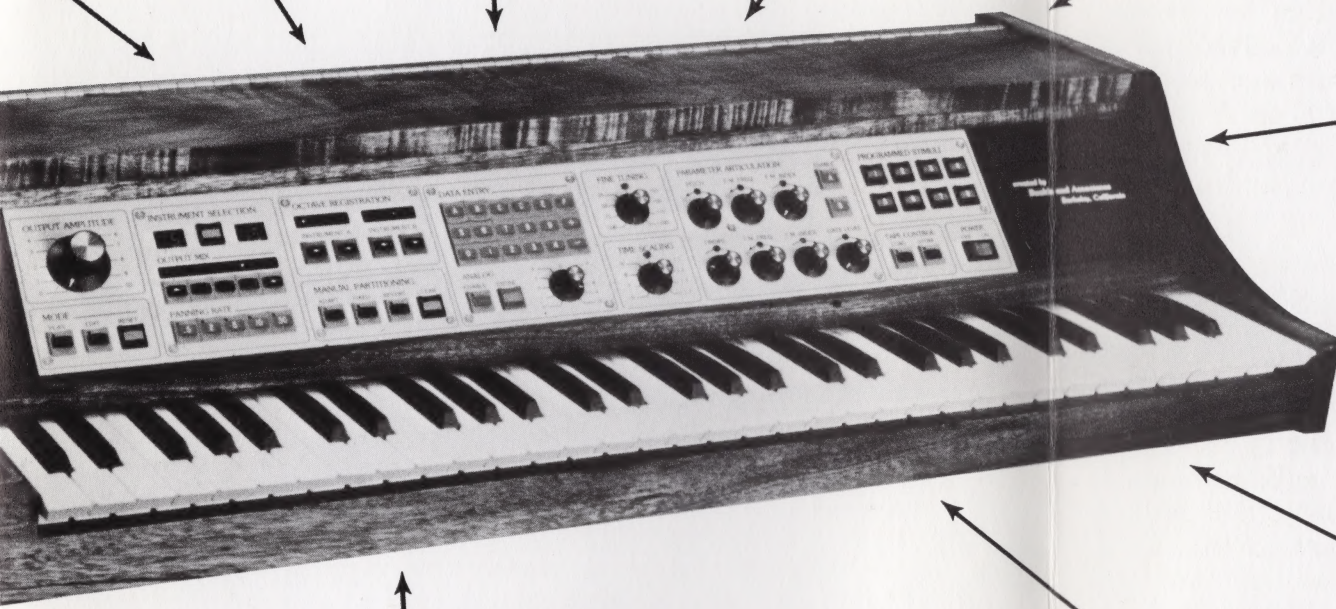
In Touché, complex time varying functions can be specified for each of six different variables. This knob enables the compression or expansion of these temporal functions without disturbing ratios or pitches.

MANUAL PARTITIONING

With Touché, two instrument definitions can be selected and performed simultaneously. The normal mode of playing two instruments is with each key activating both voices. The *fixed* partitioning mode assigns instrument A to the lower half and instrument B to the upper half of the keyboard. The *adaptive* mode assigns instrument A to the left hand; B to the right. *Reverse* interchanges instruments A and B.

MANAGING

ne two selected
ed here; auto-
the gradual
instrument into



TECHNICAL SPECIFICATIONS

AUDIO OUTPUTS (8 total)

4 channel bus
stereophonic mix
monophonic mix
level: 1.2 volts rms
impedance: 600 ohms
connectors: 1/4" phone
headset: 1.2 watt/8 ohms
 stereo 1/4" phone
S/N ratio: more than 90 db

CONTROL VOLTAGE OUTPUTS (6 total)

tablet x, y, z axes
keyboard pressure
program 1, 2 (software defined)
range: 0 to +10 volts
connectors: 1/4" phone

ADDITIONAL INTERCONNECTIONS

video: 75 ohms, BNC connector, composite signal, for use with standard video monitor
tape in/out; Odb level, miniphone connectors, for use with quality audio cassette
terminal: RS232 standard with selectable baud rate, for user access to internal computer

TUNING CHARACTERISTICS

Keyboard range: 61 keys, C through C₄
Frequency range: 16 Hz to 4500 Hz
Pitch resolution: 1/8 tone
Frequency resolution: .16 Hz
Tuning system: equal tempered -
 accurate to better than 1/8 Hz;
 alternative tunings available

CIRCUITRY AND ARCHITECTURE

supervisory control and data handling: 16 bit general purpose digital computer
user interface: 3 axis touch tablet, sealed push button switches, specialized digital processor
function generation and input correlation: 64 channel multiple arbitrary function generator
signal generation: pipelined, multiplexed digital oscillator with software controlled microcode
signal processing (gating, filtering and phasing): voltage controlled analog circuitry
software: FOIL, a prom resident, interactive, instrument definition and performance language

CONTROL VOLTAGE INPUTS (12 total)

pitch
f.m. frequency
f.m. index
timbre
t.m. frequency
t.m. index
gate level
external 1, 2, 3, 4 (software defined)
master level
range: 0 to +10 volts
connectors: 1/4" phone

STATUS INPUTS (4 total)

sustain 1 (conventional sustain)
sustain 2 ('center pedal' sustain)
stimulus 1, 2 (software defined)

ELECTRICAL REQUIREMENTS

Voltage: 110 or 220 VAC
Power: 190 watts maximum

PHYSICAL CHARACTERISTICS

Weight: 25 Kg (55 pounds)
Dimensions: 98cm x 45cm x 20cm

YOU'VE HEARD the sounds of computer music - sounds that are extraordinary in their richness and variety, but music that tends to be dull and lifeless. That's because you can't play a computer - you have to laboriously program it, describing each and every note and then waiting, (sometimes for days!) to hear what you've done. And that's hardly what music's all about.

AND YOU KNOW the expressive potential of the electronic keyboard - immediate access to a few octaves worth of notes accounts for much of the music we hear and play. But what limited sounds - filtered sawtooth waves, poor imitations of strings and organs, funky sounds that don't get down, even imitations of the imitations.

NOW WHAT IF somebody were to build advanced computer technology into a truly expressive, playable keyboard instrument?

Well, somebody did . . .

TOUCHE® is manufactured by
BUCHLA & ASSOCIATES
P.O. Box 5051
Berkeley, CA 94705